Cisco Catalyst **6500** Series Switch

The Catalyst 6500 Series sets the new standard for IP communications and application delivery in enterprise campus and service provider networks by maximizing user productivity and enhancing operational control while providing unprecedented investment protection. As Cisco's premier intelligent multilayer modular switch, the Catalyst® 6500 Series delivers secure, converged services, end-to-end, from the wiring closet to the core, to the data center, to the WAN edge.

Ideal for enterprises and service providers seeking to reduce their total cost of ownership, the Cisco Catalyst 6500 Series delivers scalable performance and port density across a range of chassis configurations and LAN/WAN/MAN interfaces. Available in 3-, 6-, 9-, and 13-slot chassis, Cisco Catalyst 6500 Series switches feature an unparalleled range of integrated services modules, including multigigabit network security, content switching, telephony, and network analysis modules.

By taking advantage of a forward-thinking architecture that uses a common set of modules and operating system software across all Cisco Catalyst 6500 Series chassis, the Catalyst 6500 Series delivers a high level of operational consistency that optimizes IT infrastructure usage and enhances return on investment. From 48-port to 576-port 10/100/1000 Ethernet wiring closets to hundreds-of-Mpps network cores supporting up to 192 1-Gbps or 32 10-Gbps trunks, the Cisco Catalyst 6500 Series provides an optimal platform that maximizes network uptime with stateful failover capability between redundant routing and forwarding engines.

With numerous industry-firsts and industry-leading features to its credit, the Catalyst 6500 Series supports three generations of modules that continue to demonstrate the Catalyst 6500 value and Cisco's commitment to innovation. Cisco's new generation of Catalyst 6500 Series modules and Supervisor Engine 720 incorporate 11 new Cisco-developed application specific integrated circuits (ASICs)—extending Cisco's leadership in networking while providing unparalleled investment protection.

Figure 1
Cisco Catalyst 6500
Series Chassis

Cisco Catalyst 6500 Series Benefits

The Cisco Catalyst 6500 Series provides market-leading services, performance, port densities, and availability with investment protection for enterprise and service provider markets. These include:

- *Maximum network uptime*—With platform, power supply, supervisor engine, switch fabric, and integrated network services redundancy provides one- to three-second stateful failover and delivers application and services continuity in a converged network environment, minimizing disruption of mission-critical data and services
- *Comprehensive network security*—Integrates proven, multigigabit Cisco security solutions, including intrusion detection, firewall, VPN, and SSL into existing networks
- *Scalable performance*—Provides up to 400 Mpps performance with distributed forwarding architecture
- *Forward-Thinking architecture with investment protection*—Supports three generations of interchangeable, hot-swappable modules in the same chassis, optimizing IT infrastructure usage, maximizing return on investment, and reducing total cost of ownership
- *Operational consistency*—Features 3-, 6-, 9-, and 13-slot chassis configurations sharing a common set of modules, Cisco IOS Software, Cisco Catalyst Operating System Software, and network management tools that can be deployed anywhere in the network
- *Unparalleled services integration and flexibility*—Integrates advanced services such as security and content with converged networks, provides the widest range of interfaces and densities, from 10/100 and 10/100/1000 Ethernet to 10 Gigabit and from DS0 to OC-48, and performs in any deployment end to end

Operational Consistency in End-to-End Cisco Catalyst 6500 Series Deployments

- Features 3-, 6-, 9-, and 13-slot chassis configurations that share a common set of modules, software, and network management tools
- Deploys anywhere in the network—from the wiring closet to the core, to the data center, to the WAN edge
- Shares WAN port adapters with Cisco 7xxx router Series for reduced sparing and training costs
- Offers choice of Cisco IOS Software and Cisco Catalyst Operating System Software supported on all supervisor engines, providing smooth migration from Cisco Catalyst 5000 Series and Cisco 7500 Series deployments

Maximum Network Uptime and Network Resiliency

- Provides packet-loss protection and the fastest recovery from network disruption
- Features fast, one- to three-second stateful failover between redundant supervisor engines
- Offers optional, redundant high-performance Cisco Catalyst 6500 Series Supervisor Engine 720, passive backplane, multimodule Cisco EtherChannel® technology, IEEE 802.3ad link aggregation, IEEE 802.1s/w, and Hot Standby Router Protocol/Virtual Router Redundancy Protocol (HSRP/VRRP) high-availability features

Integrated High-performance Security and Network Management

Integrated gigabit-per-second services modules, deployed where external devices would not be feasible, simplify network management and reduce total cost of ownership. These include:

- Gigabit firewall—provides access protection
- High-performance intrusion detection system (IDS)—provides intrusion detection protection
- Gigabit Network Analysis Module—provides a more manageable infrastructure and full Remote Monitoring (RMON) support
- High-performance SSL—provides high-performance, secure e-commerce traffic termination
- Gigabit VPN and standards-based IP Security (IPSec)—support lower cost Internet and intracampus connections

Content-and Application-Aware Layers 2 Through 7 Switching Services

- Integrated content switching module (CSM) brings high-performance, feature-rich server and firewall load balancing to the Cisco Catalyst 6500 Series, ensuring a safer and more manageable infrastructure with unprecedented control
- Integrated multigigabit SSL acceleration combined with CSM provides a high-performance e-commerce solution
- Integrated multigigabit firewall and CSM provide a secure, high-performance, data-center solution
- Software features such as Network Based Application Recognition (NBAR) enhance network management and control of bandwidth utilization

Scalable Performance

- Delivers the industry's highest LAN switch performance, 400 Mpps, using the distributed Cisco Express Forwarding dCEF720 platform
- Supports a mix of Cisco Express Forwarding (CEF) implementations and switch fabric speeds for optimal wiring closet, core, data center, and WAN edge deployments, as well as service provider networks

Rich Layer 3 Services

- Multiprotocol Layer 3 routing supports traditional network requirements and provides a smooth transition mechanism in the enterprise
- Provides hardware support for enterprise-class and service-provider-scale routing tables
- Provides IPv6 support in hardware (using Supervisor Engine 720) with an unparalleled high-performance suite of services
- Provides hardware support for large enterprise-class and service-provider-scale routing tables
- Provides MPLS support in hardware to enable VPN services within the enterprise and facilitate smooth integration with new high-speed service provider core infrastructures and Metro Ethernet deployments

Enhanced Data Voice, and Video Services

- Provides integrated IP communications throughout all Cisco Catalyst 6500 Series platforms
- Provides 10/100 and 10/100/1000 line cards, field upgradable with inline power using a daughter card and offering future support for IEEE 802.3af to protect today's investments
- Provides dense T1/E1 and foreign Exchange Station (FXS) voice-over-IP (VoIP) gateway interfaces for public switched telephone network (PSTN) access and traditional phone, fax, and private branch exchange (PBX) connections
- Supports high-performance IP multicast video and audio applications
- Provides integrated management necessary to effectively deploy a scalable enterprise-converged network

Highest Level of Interface Flexibility, Scalability, and Density

- Provides the port densities and interface choices that large mission-critical wiring closets, enterprise core, and distribution networks require
- Supports up to 576 voice 10/100/1000 Gigabit-over-copper ports with inline power per system
- Provides up to 192 Gigabit Ethernet ports

- Features the industry's first 10 Gigabit Ethernet, Channelized OC-48 dense OC-3 Packet over Synchronous Optical Network (SONET) (PoS)
- Provides investment protection by using Cisco 7xxx Series port adapters on the Cisco Catalyst 6500 Series FlexWAN Line Card, supporting T1/E1 through OC-48 WAN interfaces
- Chassis sizes range from 3-slot (Cisco Catalyst 6503 Switch) to 13-slot (Cisco Catalyst 6513 Switch)

High-Speed WAN Interfaces

- Provides high-speed WAN, ATM, and SONET interfaces compatible with other core routers
- Provides single-device management for WAN aggregation and for campus and metro connectivity

Maximum Investment Protection

- Highly flexible modular architecture supports multiple generations of modules that are fully interoperable with each other in the same chassis
- Upgradable supervisor engines can add Layer 3 routing or forwarding capabilities over time
- Cisco IOS Software and Cisco Catalyst Operating System Software are supported across all supervisor engines
- Field-upgradable inline power for 10/100 Mbps and 10/100/1000 Mbps Ethernet modules for "pay as you go" IP telephony and wireless computing
- A steady stream of new services modules adds to the deployment options
- Includes Cisco Catalyst 6500 Series network security, content switching, and voice capabilities
- Future modules will increase performance, port density, and include additional services

Ideal for Metro Ethernet WAN Services

- 802.1Q and 802.1Q tunneling (QinQ) providing point-to-point and multipoint Ethernet services
- EoMPLS in MPLS backbones for superior network scaling providing virtual LAN (VLAN) translation capability
- Layer 2 and Layer 3 QoS enables tiered Ethernet service offerings through rate limiting and traffic shaping
- Superior high-availability features include enhanced Spanning Tree Protocol, IEEE 802.1s, IEEE 802.1w, and Cisco EtherChannel IEEE 802.3ad link aggregation

Table 1 Catalyst 6500 Series at a Glance

Feature	Catalyst 6500 Series
System Feature	
Chassis Configurations	3-slot 6-slot 9-slot 9 vertical slots 13-slot
Backplane Bandwidth	32Gbps shared bus 256Gbps switch fabric 720Gbps switch fabric
L3 Forwarding Performance	Supervisor 1 MSFC: 15 Mpps Supervisor 2 MSFC: up to 210 Mpps Supervisor 720: up to 400 Mpps

Table 1 Catalyst 6500 Series at a Glance

| Feature	Catalyst 6500 Series
Operating System	Catalyst OS (CatOS) Cisco IOS CatOS/IOS Hybrid Configuration
Redundant Supervisors	Yes, with stateful failover
Redundant Components	Power supplies (1+1) Switch fabric (1+1) Replaceable clock Replaceable fan tray
High Availability Features	Gateway Load Balancing Protocol Hot Standby Router Protocol Multimodule EtherChannel Rapid Spanning Tree Multiple Spanning Tree Per VLAN Rapid Spanning Tree Rapid Convergence L3 Protocols
Maximum System Port Densities	
10/100/1000 Ethernet	576 ports, all support Inline Power
10/100 Fast Ethernet	576 ports, all support Inline Power
100-Base-FX	288 ports
Gigabit Ethernet (GBIC)	194 ports (2 ports provided on supervisor engine)
10 Gigabit Ethernet (XENPAK)	32 ports
Integrated WAN Modules	
FlexWAN (DS0 to OC-3)	12 modules with 24 port adapters
OC-3 POS ports	192
OC-12 POS ports	48
OC-12 ATM ports	24
OC-48 POS/DPT ports	24
PSTN Interfaces	
Digital T1/E1 Trunk ports	216
FXS Interfaces	864
Advanced Services Modules	Gigabit Firewall Gigabit VPN High Performance Intrusion Detection Gigabit Content Switching Module High Performance SSL Termination Gigabit Content Services Gateway

Deployment Scenarios

The Cisco Catalyst 6500 Series delivers secure converged services for campus, Internet service provider (ISP), metro edge, and research and grid computing networks.

- *Campus networks*—Features 10/100 and 10/100/1000 autosensing modules that provide inline power for the wiring closet, along with robust high availability, security, and manageability features; world-class networking software; high-performance Gigabit and 10 Gigabit interface modules; and network management for the distribution and core
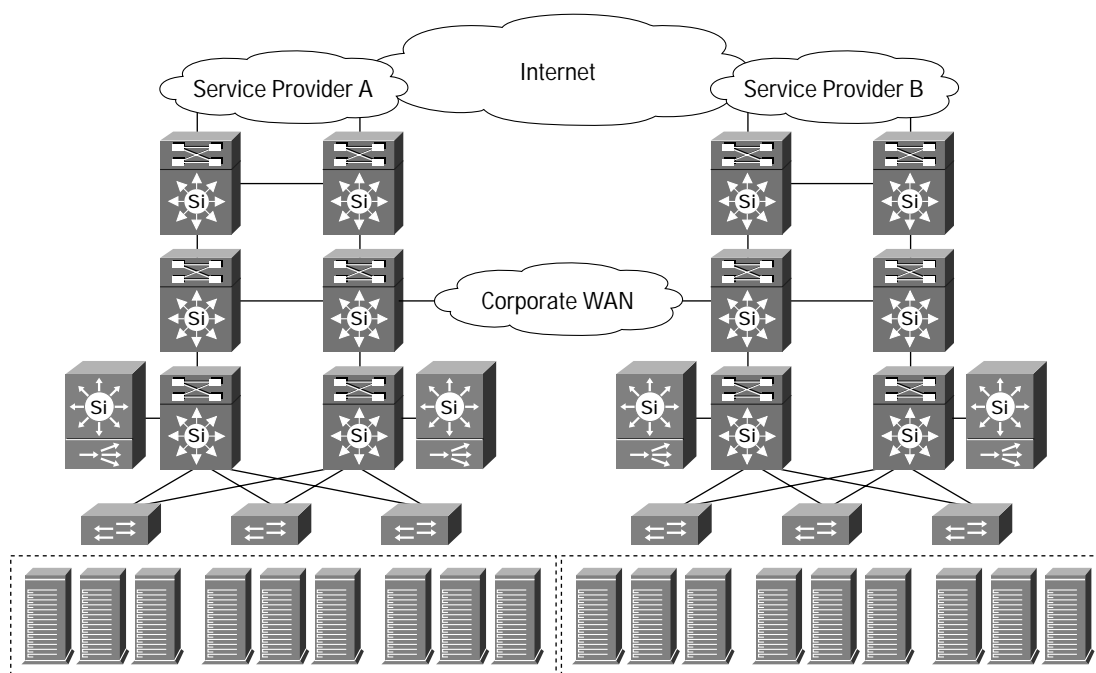
Figure 2

Deployment Scenarios for Catalyst 6500 Series Switches in Campus Networks
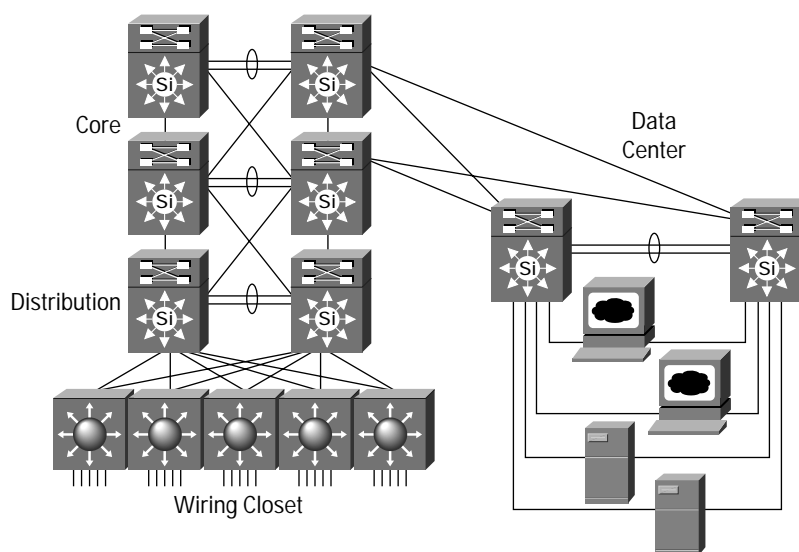
- [*ISP network—*Provides robust high-availability, security, and manageability features; world-class networking software; high-performance Gigabit and 10 Gigabit interface modules; and network management for the most demanding service provider networking environments requiring Multiprotocol Label Switching (MPLS), Multicast, IP Version 6 (IPv6), an extensive set of WAN interfaces, and hierarchical traffic shaping.
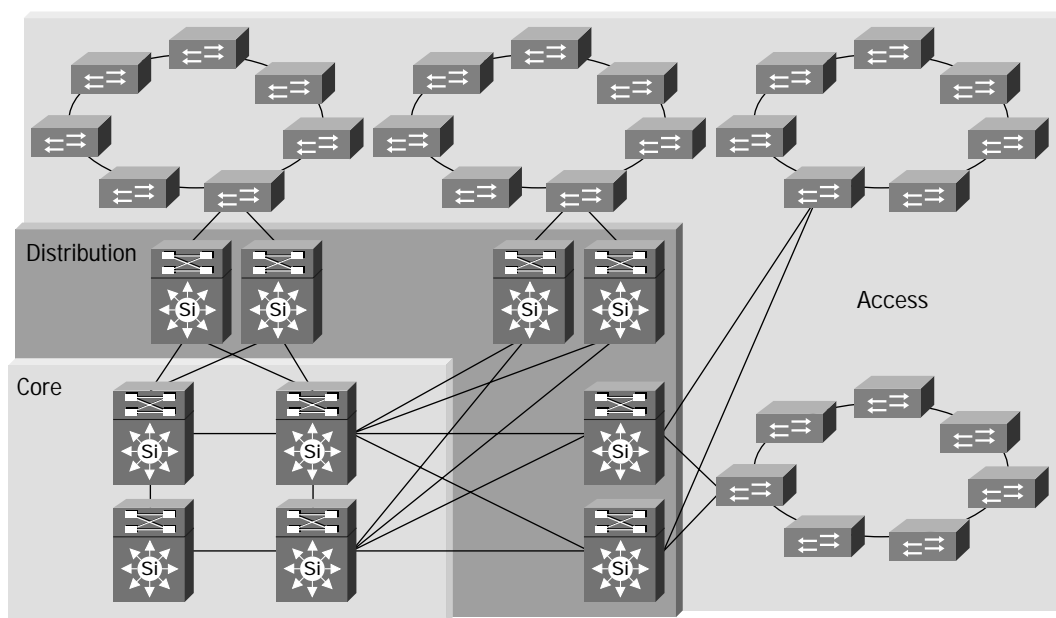
Figure 3

Deployment Scenarios for Catalyst 6500 Series Switches in ISP Networks

- *Metro edge*—Features edge-, distribution-, and core-layer interfaces for point-to-point and multipoint Ethernet services for metro and inter-metro network deployments with the following features:

  – High-performance 10-Gigabit Ethernet uplinks

  – 802.1Q tunneling

  – Ethernet over MPLS (EoMPLS)

  – Layer 2 and Layer 3 QoS

  – Network Equipment Building Standards (NEBS) compliance

  – Security, high availability, and manageability

Figure 4

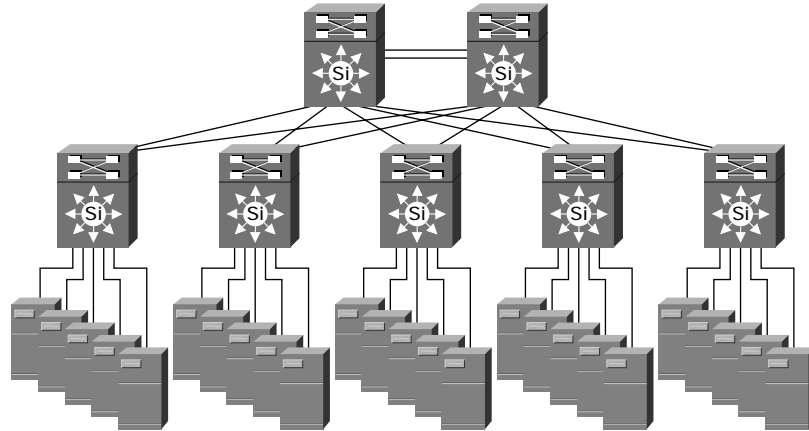Deployment Scenarios for Catalyst 6500 Series Switches in Metro Edge

- *Grid computing network*—Provides high-speed optical interface modules and world-class software required to handle high-volume traffic and build and manage large-scale networks

Figure 5
Deployment Scenarios for Catalyst 6500 Series Switches in Grid Computing Network

System Overview

Modular Architecture

The Cisco Catalyst 6500 Series is a modular system that can grow as customer requirements expand and technology evolves, allowing customers to upgrade and reconfigure systems by adding new modules, replacing existing modules, and adding and redeploying systems. Throughout the Cisco Catalyst 6500 Series, modules are:

- *Configurable*—Separately, simplifying the addition of new services
- *Interoperable*—In the same chassis, providing flexible design options
- *Interchangeable*—Among Cisco Catalyst 6500 Series systems, simplifying sparing and network expansion
- *Hot-swappable*—Without requiring a chassis to be powered off, providing fast upgrade and repair
- *Upgradable*—As newer modules come along, providing investment protection

Cisco Catalyst 6500 Series Hardware-Forwarding Architectures

Cisco Catalyst 6500 Series modules use one of three forwarding technologies, each having a different architecture with different characteristics and capabilities:

- *Cisco Express Forwarding (CEF)*—Scaling to 30 Mpps, this technology uses a central CEF Cisco Express Forwarding engine located on the supervisor engine's policy feature card (PFC) daughter and CEF forwarding tables located on the supervisor engine. The supervisor engine makes all forwarding decisions for all interface modules centrally. For more information see *How Cisco Express Forwarding Works.*
- *Accelerated Cisco Express Forwarding (aCEF)*—Suited for high-performance enterprise environments, this technology uses the aCEF engine and aCEF tables located on the interface module, along with the central CEF engine located on the supervisor engine's PFC daughter card and central CEF forwarding tables located on the supervisor engine. The interface module makes high-volume forwarding decisions locally, and the supervisor engine makes the rest of the forwarding decisions centrally. For more information see *How Accelerated Cisco Express Forwarding (aCEF) Works.*
- *Distributed Cisco Express Forwarding (dCEF)* —Suited for the most demanding environments, this technology uses the dCEF engine located on the interface module's distributed forwarding card (DFC) daughter card and the dCEF table, a local copy of the supervisor engine's central CEF table located on the interface module's DFC. The interface module makes all the forwarding decisions locally, and provides maximum performance and scalability. For more information see *How Distributed Cisco Express Forwarding (dCEF) Works*

Cisco Catalyst 6500 Series Switching Architectures

Cisco developed the following switching architectures for Cisco Catalyst 6500 modules to allow platforms to scale in any deployment:

- 32-Gbps bus—Allowing access to a central shared bus
- 256-Gbps switch fabric—Located on the switch fabric module (SFM)
- 720 Gbps switch fabric—Located on Cisco Catalyst 6500 Series Supervisor Engine 720

Cisco Catalyst 6500 Series Modules

Cisco Catalyst 6500 Series interfacecmodules support the following forwarding technology and switch fabric combinations:

- *Classic Interface Modules*—Use the centralized CEF engine located on the supervisor engine's PFC, connect to the 32-Gbps switching bus only, and forward packets at up to 15 Mpps
- *CEF256 Interface Modules*—Use the centralized CEF engine located on the supervisor engine's PFC, connect to both the 256-Gbps fabric located on the supervisor engine with a single 8-Gbps full-duplex fabric connection and the 32-Gbps switching bus, and forward packets at up to 30 Mpps
- *dCEF256 Interface Modules*—Use the distributed CEF engine on the DFC (located on the interface module), connect to a 256-Gbps fabric located on the supervisor engine or a Switch Fabric Module with 16-Gbps full-duplex fabric connections, and forward packets at up to 210 Mpps
- *aCEF720 Interface Modules*—Use the accelerated CEF engine on the DFC3 (located on the interface module), connect to the 720-Gbps fabric located on the supervisor engine with 40-Gbps full-duplex fabric connections, and forward packets at up to 400 Mpps, peak performance
- *dCEF720 Interface Modules*—Use the distributed CEF engine on the DFC3 (located on the interface module), connect to the 720-Gbps fabric located on the supervisor engine with dual 20-Gbps full-duplex fabric connections, and forward packets at up to 400 Mpps, sustained performance

Note: All Performance numbers refer to IPv4 forwarding.

Cisco Catalyst 6500 Series Module Types

In the Cisco Catalyst 6500 Series architecture, special-purpose modules perform separate tasks—allowing the feature set to evolve quickly and allowing customers to add new features and enhanced performance by adding new modules. The Cisco Catalyst 6500 Series features the following types of special-purpose modules:

- *Supervisor engines*—Perform the control functions and make the forwarding decisions for packets routed to other networks
- *Ethernet interface modules*—Provide IEEE-standard receive and forwarding interfaces and forward packets within the defined network
- *WAN interface modules*—Provide the receive and forwarding interface at the WAN edge
- *Services modules*—Support multigigabit security, application-aware Layer 4 through 7 content switching, network management, and voice gateway services to traditional phones, fax machines, PBXs, and the PSTN
- *Switch Fabric Modules (SFMs)*—Pass network traffic from interface module to the supervisor engine or to another interface

Cisco Catalyst 6500 Series Supervisor Engines

The supervisor engines for the Cisco Catalyst 6500 Series support different forwarding technologies and achieve different forwarding rates, depending on the configuration of the supervisor engine and the capability of a particular interface module.

Supervisor engines can be configured with optional factory-installed daughter cards—a Policy Feature Card (PFC) providing hardware-based Layer-2 forwarding, and a Multilayer Switch Feature Card (MSFC) providing Layer 3 capabilities.

A supervisor engine performs control operations centrally on processors that run either Cisco IOS Software or Cisco Catalyst Operating System Software while special-purpose application-specific integrated circuits (ASICs) perform bridging and routing (based on Cisco Express Forwarding), QoS marking and policing, and access control. The same ASICs are used on the DFCs, daughter cards that can be installed on certain interface modules to distribute forwarding in a decentralized fashion to achieve system forwarding rates of up to 400 Mpps (Table 2).

For additional information about the following Cisco Catalyst 6500 Series supervisor engines visit:

http://www.cisco.com/en/US/products/hw/switches/ps708/products_data_sheets_list.html

- Cisco Catalyst 6500 Series Supervisor Engine 720 Data Sheet
- Cisco Catalyst 6500 Series Supervisor Engine 1A and Supervisor Engine 2 Data Sheet

Table 2 Cisco Catalyst 6500 Supervisor Engines

Feature	Supervisor Engine 1	Supervisor Engine 2	Supervisor Engine 720
Solution and market	Wiring closet	Enterprise distribution, core, and WAN edge; service provider WAN and Internet edge	Enterprise core and data center; service provider metro; wireless; national research networks; grid computing
Fabric architectures supported	Centralized forwarding only—engine located on supervisor engine's PFCx daughter card	Centralized CEF—engine located on supervisor engine's PFCx daughter card; Distributed CEF—engine located on interface module's DFC daughter card	Centralized CEF—engine located on Supervisor Engine 720's PFC3 daughter card; Distributed CEF—engine located on interface module's DFC3 daughter card; Accelerated CEF—engine located on interface module's ASICs
Fabric connections	32-Gbps shared bus connection to modules	16 Gbps per slot; Dual-fabric connection to modules at 8 Gbps full duplex per channel	40 Gbps per slot; Dual-fabric connection to modules at 20 Gbps full duplex per channel
Performance maximum (Mpps)	15 Mpps	210 Mpps	Sustained 400 Mpps—dCEF720; Peak 400 Mpps—aCEF720
DFC modules	Not supported	DFC	DFC3

Table 2 Cisco Catalyst 6500 Supervisor Engines

Feature	Supervisor Engine 1	Supervisor Engine 2	Supervisor Engine 720
Route processor	On MSFC2 daughter card (optional)	On MSFC2 daughter card (optional)	MSFC3 integrated
PFC modules	PFC daughter card (optional)	PFC2 integrated	PFC3 integrated

Ethernet Interface Modules

Cisco Catalyst 6500 Series Ethernet interface modules, designed for wiring closet, distribution and core, and data center applications, as well as service provider and Metro Ethernet environments, use one of the following types of Ethernet interfaces:

- *10/100 Mbps over copper and 10/100/1000 Mbps Ethernet over copper*—For wiring closets providing 10/100- and 10/100/1000-Mbps performance with auto-negotiation and inline power for voice; up to 48 ports/module; includes Classic and CEF256 interface modules.

- *100 Mbps over fiber*—For secure wiring closets and long-haul router and switch interconnects; up to 24 ports per module; includes Classic and CEF256 interface modules.

- *1 Gbps*—For distribution and core layers and for data centers providing 1-Gbps performance in a 48-port module; includes Classic CEF256, and dCEF256 interface modules.

- 10 Gbps—For distribution and core layers providing 10-Gbps performance in 1-port or 2-port module; includes CEF256, aCEF720, and dCEF720 interface modules.

For more information, visit:

http://www.cisco.com/en/US/products/hw/switches/ps708/products_data_sheets_list.html

WAN Interface Modules

The Cisco Catalyst 6500 Series and Cisco 7600 Series support several WAN interfaces using two technologies:

- *FlexWAN module*—Accepts up to two plug-in port adapters that provide numerous WAN/MAN protocols and features

- *Optical Services Module (OSM)*—A dedicated line card that provides several interfaces, including OC-3/STM-1, OC-12/STM-4, OC-48/STM-16, Channelized T3, Channelized OC-12/STM-4 PoS, Gigabit Ethernet, OC-12/STM-4 ATM, and OC-48/STM-16 Dynamic Packet Transport (DPT)

FlexWAN Module

The FlexWAN module fits inside Cisco Catalyst 6500 Series and Cisco 7600 Series systems and uses Cisco 7200 and 7500 Series port adapters for a wide range of WAN/MAN protocols, including Frame Relay, ATM, PoS, Point-to-Point Protocol (PPP), and High-Level Data Link Control (HDLC). Additionally, the FlexWAN module provides media options such as clear channel and Channelized T1/E1, T3/E3, High-Speed Service Interface (HSSI), OC-3 PoS, and ATM.

- For information about the Cisco Catalyst 6500 Series and Cisco 7600 Series FlexWAN Module, visit:
http://www.cisco.com/en/US/products/hw/routers/ps368/products_data_sheet09186a00800923bf.html

Optical Services Modules

OSMs are line cards that provide high-speed WAN connectivity with onboard network processors for distributed-line-rate IP service applications. For more information about OSMs, see the following data sheets:

- Cisco 7600 Series 4-, 8-, and 16-Port OC-3c/STM-1 PoS/SDH OSM:
  http://www.cisco.com/en/US/products/hw/routers/ps368/products_data_sheet09186a0080092249.html
- Cisco 7600 Series 4-Port Gigabit Ethernet OSM:
  http://www.cisco.com/en/US/products/hw/routers/ps368/products_data_sheet09186a008009223d.html
- Cisco 7600 Series 1-Port Channelized OC-12/STM-4 to DS3/E3 OSM:
  http://www.cisco.com/en/US/products/hw/routers/ps368/products_data_sheet09186a0080092250.html
- Cisco 7600 Series 1-Port OC-48c/STM-16 PoS/SDH/OSM:
  http://www.cisco.com/en/US/products/hw/routers/ps368/products_data_sheet09186a0080092241.html
- Cisco 7600 Series 2- and 4-Port OC-12c/STM-4 PoS/SDH OSM:
  http://www.cisco.com/en/US/products/hw/routers/ps368/products_data_sheet09186a008009223e.html
- Cisco 7600 Series 2-Port ATM OSM:
  http://www.cisco.com/en/US/products/hw/routers/ps368/products_data_sheet09186a008008876f.html
- Cisco 7600 Series 2-Port OC-48c/1-Port OC-48c DPT OSM:
  http://www.cisco.com/en/US/products/hw/routers/ps368/products_data_sheet09186a0080088774.html
  Layer 4 Through 7 Services Modules

The Cisco Catalyst 6500 Series offers an extensive set of services modules for Layer 4 through 7 applications, including content services, network monitoring, security, and telephony.

Content Services Modules

- *Content Services Gateway (CSG)*—Enables differentiated billing, user balance enforcement, and activity tracking for customer billing systems. For more information, visit: http://mobiletraining.cisco.com/csg/CSGe_ds_0211.pdf
- *Content Switching Module (CSM)*—Integrates advanced content switching into the Cisco Catalyst 6500 Series to provide high-performance, high-availability load balancing of caches, firewalls, Web servers, and other network devices. For more information, visit:
  http://www.cisco.com/en/US/products/hw/modules/ps2706/products_data_sheet09186a00800887f3.html

Network Monitoring

- *Network Analysis Module (NAM 1 and 2)*—Provides application-level visibility into the network infrastructure for real-time traffic analysis, performance monitoring, and troubleshooting; performs traffic monitoring with embedded Web-based traffic analyzer. For more information, visit:
  http://www.cisco.com/en/US/products/hw/modules/ps2706/products_data_sheet09186a00800a2c89.html

Security Services Modules

- *Firewall Services Module (FWSM)*—The FWSM allows any port in the chassis to operate as a firewall port and integrates stateful firewall security inside the network infrastructure. For more information, visit:
  http://www.cisco.com/en/US/products/hw/modules/ps2706/products_data_sheet09 186a00800c4fe7.html
  Intrusion Detection System Module (IDSM and IDSM-2)—Takes traffic from the switch backplane at wire speed, integrating IDS functions directly into the switch. For more information, visit:
  http://www.cisco.com/en/US/products/hw/modules/ps2706/products_data_sheet09186a0080092341.html

- *IPSec VPN Module (IVSM)*—Provides infrastructure-integrated IPSec VPN services capable of 1.9-Gbps Triple Data Encryption Standard (3DES) performance, 8000 active tunnels, and up to 60 tunnels per second. For more information, visit:
  http://www.cisco.com/en/US/products/hw/modules/ps2706/products_data_sheet09 186a00800c4fe2.html
- *SSL Services Module (SSM)*—Offloads processor-intensive tasks related to securing traffic with SSL accelerating the performance and increasing the security of Web-enabled applications. For more information, visit:
  http://www.cisco.com/en/US/products/hw/modules/ps2706/products_data_sheet09186a00800c4fe9.html

Telephony Services Modules

- *Communications Media Module (CMM)*—Provides flexible, high-density T1 and E1 gateways, allowing organizations to connect their existing time-division multiplexing (TDM) networks to their IP communications networks, and providing connectivity to the PSTN. For more information, visit:
  http://www.cisco.com/en/US/products/hw/modules/ps3115/products_data_sheet09 186a00800e9c1f.html

Switch Fabric Modules

Designed to support distributed forwarding for interface modules that have distributed forwarding capability, the Cisco Catalyst 6500 Series SFM or SFM2, in combination with the Cisco Catalyst 6500 Series Supervisor Engine 2-MSFC2 and DFCs on interface modules, increases available system bandwidth from 32 to 256 Gbps. The SFM/SFM2 supports the Cisco Catalyst 6500 CEF256 and dCEF256 interface modules.

Designed to support new interface modules with 720 Gbps forwarding capabilities, the Supervisor Engine 720's onboard switch fabric increases available bandwidth to 720 Gbps and enables packet forwarding rates up to 400 Mpps. By using auto-sensing and auto-negotiation, the Supervisor 720 switch fabric is fully interoperable with the 8- and 16-Gbps switch fabric interconnections used by the CEF256 and dCEF256 interface modules. When a CEF256 or dCEF256 interface module is detected, the switch fabric will automatically connect those modules by offering 8-16 Gbps of bandwidth to each module, as applicable.

How Cisco Express Forwarding Works

Cisco Express Forwarding (CEF) is a Layer 3 technology that provides increased forwarding scalability and performance to handle many short-duration traffic flows common in today's enterprise and service provider networks. To meet the needs of environments handling large amounts of short-flow, Web-based, or highly interactive types of traffic, CEF forwards all packets in hardware, and maintains its forwarding rate completely independent of the number of flows going though the switch.

On the Cisco Catalyst 6500 Series, the CEF Layer 3 forwarding engine is located centrally on the supervisor engine's PFC2 or PFC3—the same device that performs hardware-based Layer 2 and 3 forwarding, ACL checking, QoS policing and marking, and NetFlow statistics gathering.

Using the routing table that Cisco IOS Software builds to define configured interfaces and routing protocols, the CEF architecture creates CEF tables and downloads them into the hardware-forwarding engine before any user traffic is sent through the switch. The CEF architecture places only the routing prefixes in its CEF tables—the only information it requires to make the Layer 3 forwarding decisions—relying on the routing protocols to do route selection. By performing a simple CEF table lookup, the switch forwards packets at wire-rate, independent of the number of flows transiting the switch.

CEF-based forwarding requirements: Requires a Cisco Catalyst Supervisor Engine 2 or Catalyst Supervisor Engine 720.

How Accelerated Cisco Express Forwarding (aCEF) Works

Accelerated Cisco Express Forwarding (aCEF) technology uses two forwarding engines working together in a master-slave relationship to accelerate high-rate traffic flows through the switch—a central CEF engine located on the Supervisor Engine 720's PFC3 and a scaled-down distributed aCEF engine located on the interface module.

The central PFC3 makes the initial forwarding decision, with the aCEF engine storing the result and making subsequent packet-forwarding decisions locally. aCEF forwarding works like this:

- As in standard CEF forwarding, the central PFC3 is loaded with the necessary CEF information before any user traffic arrives at the switch.
- As traffic arrives on an aCEF720 interface module, the aCEF engine inspects the packet, and finding that no specific packet forwarding information exists, consults the central PFC3.
- The PFC3 makes a hardware-based forwarding decision for this packet (including Layer 2, Layer 3, ACLs, and QoS).
- The aCEF engine stores the forwarding decision results and makes forwarding decisions locally for subsequent packets based on packet-flow history.
- The aCEF engine handles hardware-based Layer 2 and Layer 3 forwarding, ACLs, QoS marking, and NetFlow.
- The central PFC3 processes any forwarding decisions that the interface module's aCEF engine cannot handle.

aCEF-based forwarding requirements: Requires a Cisco Catalyst Supervisor Engine 720 and aCEF720 (WS-X67xx) class modules.

### How Distributed Cisco Express Forwarding (dCEF) Works

With Distributed Cisco Express Forwarding (dCEF), forwarding engines located on the interface modules make forwarding decisions locally and in parallel, allowing the Cisco Catalyst 6500 Series to achieve the highest forwarding rates in the industry. With dCEF, forwarding occurs on the interface modules in parallel and system performance scales up to 400 Mpps—the aggregate of all forwarding engines working together.

Using the same ASIC engine design as the central PFCx, DFCs located on the interface modules forward packets between two ports, directly or across the switch fabric, without involving the supervisor engine. With the DFC, each interface module has a dedicated forwarding engine complete with the full forwarding tables. dCEF forwarding works like this:

- As in standard CEF forwarding, the central PFC3 located on the supervisor engine and the DFC engines located on the interface modules are loaded with the same CEF information derived from the forwarding table before any user traffic arrives at the switch.

- As a packet arrives at an interface module, its DFC engine inspects the packet and uses the information in the CEF table (including Layer 2, Layer 3, ACLs, and QoS) to make a completely hardware-based forwarding decision for that packet.

- The dCEF engine handles all hardware-based forwarding for traffic on that module, including Layer 2 and Layer 3 forwarding, ACLs, QoS policing and marking, and NetFlow.

- Because the DFCs make all the switching decisions locally, the supervisor engine is freed from all forwarding responsibilities and can perform other software-based functions, including routing, management, and network services.

Figure 6

Distributed Cisco Express Forwarding Packet Flow
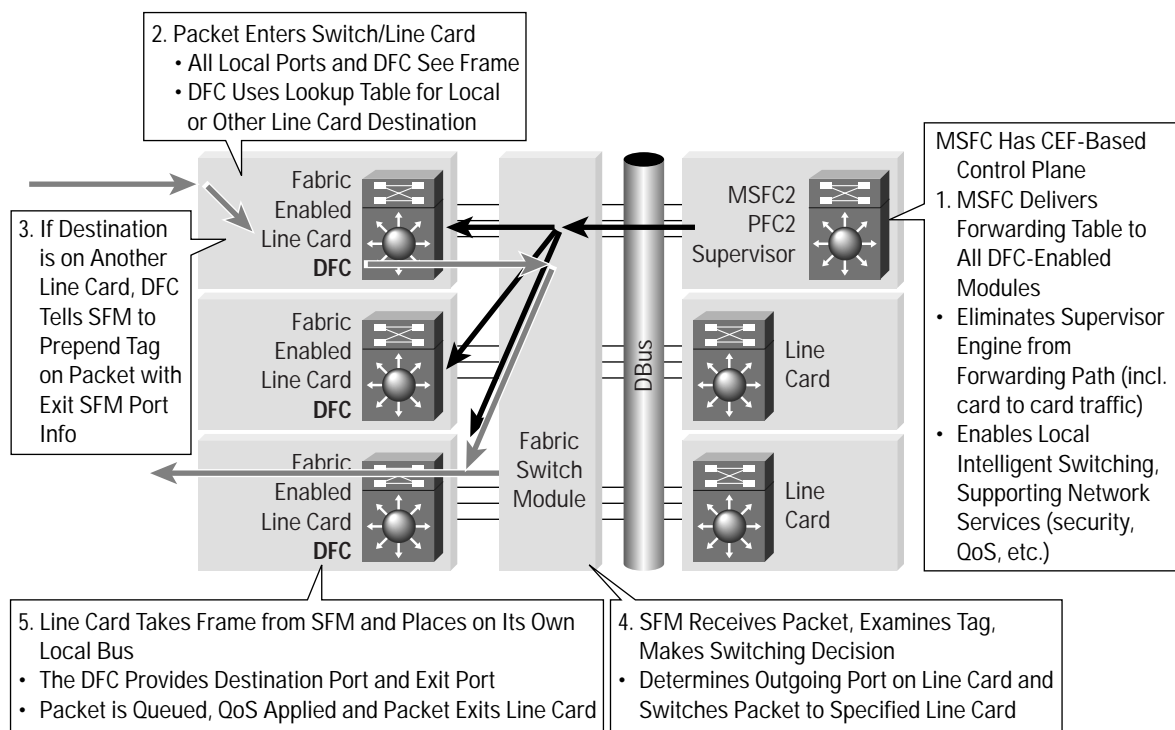
dCEF-based forwarding requirements: Requires a Cisco Catalyst Supervisor Engine 720 for the dCEF720 interface module; requires either a Catalyst Supervisor Engine 720 or a Catalyst Supervisor Engine 2-MSFC2 and a SFM for the dCEF256 interface module.

Cisco IOS Software and Catalyst Operating System Software

Cisco Catalyst 6500 Series switches offer two operating modes of software, the Cisco Catalyst Operating System Software with optional Cisco IOS Software on the MSFC, and Cisco IOS Software for the supervisor engines. Each operating mode can be deployed at different hierarchies of the network, depending on the network's requirements. These software solutions for the Cisco Catalyst 6500 Series switches provide full Layer 2 through 4 switching and routing functions at high performances.

Today, either of these operating modes can be deployed in an entire network environment, or the operating modes can vary within an environment to meet different requirements. One operating mode is not a replacement for another, but is recommended for varying feature requirements.

- Cisco IOS Software for the Cisco Catalyst 6500 Series
- Cisco Catalyst Operating System Software with optional Cisco IOS Software on the MSFC

Cisco IOS Software for the Cisco Catalyst 6500 Series

Cisco IOS Software for the Cisco Catalyst 6500 Series supervisor engines requires the MSFC on the supervisor engine. It provides integrated multilayer functions in a single image and is optimized for core, distribution, Internet access, and data center deployments. Cisco IOS Software combined with the performance of the Cisco Catalyst 6500 Series offers the necessary features for a high-performance Layer 3-enabled deployment, including support for a distributed architecture with the ability to scale the switch to 400 Mpps throughput. Additionally, Cisco IOS Software provides operational ease of use by offering a single image and configuration file to be deployed across the Cisco Catalyst 6500 Series switches.

Cisco Catalyst Operating System Software with Optional Cisco IOS Software on the MSFC

Cisco Catalyst Operating System Software is the premier software for the wiring closet on Cisco Catalyst 6500 Series switches offering high-performance Layer 2 forwarding. It is optimized to deliver the high availability, enhanced security, and integrated inline power support necessary for mission-critical wiring closet deployments. Cisco Catalyst Operating System Software can also be extended to the distribution and core layers of the network when coupled with Cisco IOS Software on the MSFC, providing robust and advanced Layer 3 and Layer 4 functions. This operating mode is often referred to as "hybrid mode." See Table 3 for software and hardware deployment options.

Table 3 Software and Hardware Deployment Options

Network Performance	Wiring Closet	Distribution/ Data Center	Core	WAN Edge
Highest-performance Cisco IOS Software end-to-end	Cisco IOS Software; Supervisor Engine 2-MSFC2; CEF256 interface modules	Cisco IOS Software; Supervisor Engine 720; dCEF720 and aCEF720 interface modules	Cisco IOS Software; Supervisor Engine 720; dCEF720 interface modules	Cisco IOS Software; Supervisor Engine 2-MSFC2; dCEF720 and aCEF720 interface modules
Higher-performance mixed operating system	Cisco Catalyst Operating System Software; Supervisor Engine 2-PFC2; CEF256 and Classic interface modules	Cisco IOS Software; Supervisor Engine 2-MSFC2; dCEF256 and CEF256 interface modules	Cisco IOS Software; Supervisor Engine 720; dCEF720 and aCEF720 interface modules	Cisco IOS Software; Supervisor Engine 2-MSFC2; dCEF256 and, CEF256 interface modules
High-performance Cisco Catalyst Operating System Software end-to-end	Cisco Catalyst Operating System Software; Supervisor Engine 1-2GE; CEF256 and Classic interface modules	Hybrid mode; Supervisor Engine 2-MSFC2; CEF256 and Classic interface modules	Hybrid mode; Supervisor Engine 2-MSFC2; dCEF720 Series and aCEF720 interface modules	Hybrid mode; Supervisor Engine 2-MSFC2; CEF256 and Classic interface modules

Cisco IOS Software and Cisco Catalyst Operating System Software Shared Features

All Cisco Catalyst 6500 Series supervisor engines, including the new Supervisor Engine 720, take advantage of the industry-leading software and management capabilities of the Cisco Catalyst 6500 Series. Customers can apply their knowledge of Cisco Catalyst Operating System Software, Cisco IOS Software, CiscoWorks, and other graphical and Web-based network management tools without the need to learn a new command-line interface (CLI) or management system.

Cisco Catalyst 6500 Series Chassis

Cisco Catalyst 6500 Series chassis can be deployed in the wiring closet, the distribution and core layers, the data center, and the WAN edge, providing the power and features required for end-to-end deployment for the enterprise campus, the ISP network, metro, and research computing networks.

Chassis Applications

The Cisco Catalyst 6500 Series provides a selection of chassis, including 3-, 6-, 9-, and 13-slot models with slots arranged horizontally and a 9-slot model with slots arranged vertically, with front-to-back airflow. Typical applications for Cisco Catalyst 6500 Series chassis include:

- *3-slot chassis*—Low-density, wiring-closet chassis sharing interface modules and supervisor engines with larger chassis for common sparing; low-density, high-performance specialized services modules chassis for network security and management; low-density, high-end chassis providing connectivity to the WAN edge
- *6- and 9-slot chassis*—Traditional chassis for the wiring closet, distribution and core, data center, and WAN edge
- *13-slot chassis*—Highest-capacity chassis for Ethernet connectivity, with slots to spare for services modules providing network security and management

Chassis Configuration

All Cisco Catalyst 6500 Series chassis are NEBS Level-3 compliant and use common power supplies. The 6- and 9-slot chassis require a 1000W or 1300W power supply and the 13-slot chassis requires a 2500W or 4000W power supply. The 3-slot chassis requires a 950W power supply. When ordering a Cisco Catalyst 6500 Series switch, use the online Cisco Dynamic Configuration Tool to assist you in selecting the chassis, power supplies, power cables, and fan trays that will meet your requirements. The tool is available at:
http://www.cisco.com/appcontent/apollo/configureHomeGuest.html

Power

All Cisco Catalyst 6500 chassis hold up to two load-sharing, fault-tolerant, hot-swappable AC or DC power supplies. Only one supply is required to operate a fully loaded chassis. If a second supply is installed, it operates in a load-sharing capacity. The power supplies are hot-swappable—a failed power supply can be removed without powering off the system.

Cisco Catalyst 6500 Series switch power supplies are available in five power ratings:

- 950W AC input (Cisco Catalyst 6503 chassis)
- 1000W AC input
- 1300W AC and DC input
- 2500W AC and DC input
- 4000W AC input

Table 4 outlines the power requirements and heat dissipation for the three different models of power supplies available for the Cisco Catalyst 6500 Series switch.

Table 4 Power Supply VAC and VDC requirements

Power Supply	AC Input Voltage/Current	DC Input Voltage/Current
950W	100 to 240 VAC (10% for full range); 15 A	-48 VDC to –60 VDC continuous; 38 A @ –48 VDC, 30 A @ –60 VDC
1000W	100 to 240 VAC (10% for full range); 12 A @ 100 VAC, 6 A @ 240 VAC	Not supported
1300W	100 to 240 VAC (10% for full range); 17.25 A @ 100 VAC, 8 A @ 200 VAC	–48 VDC to –60 VDC continuous; 38 A @ –48 VDC, 30 A @ –60 VDC
2500W	100 to 120 VAC, 200 to 240 VAC (10% for full range); 16 A maximum at 200 VAC at 2500 W output; 16 A maximum at 100 VAC at 1300 W output	–48 VDC to –60 VDC continuous; 80 A @ –40.5 VDC, 70 A @ –48 VDC, 55 A @ –60 VDC
4000W	100 to 240 VAC (10% for full range); 23 A	Not supported

Fan Trays

Chassis that have a Supervisor Engine 720 installed require a high-speed fan tray. See Table 5 for part number information.

Table 5 Catalyst 6500 Chassis Fan Tray Part Numbers

Catalyst 6500 Chassis	Normal Speed Fan— Fan Tray Part Number	High Speed Fan— Fan Tray Part Number
6503	FAN-MOD-3	FAN-MOD-3-HS(=)
6506	WS-C6K-6SLOT-FAN	WS-C6K-6SLOT-FAN2
6509	WS-C6K-6SLOT-FAN	WS-C6K-9SLOT-FAN2
6509-NEB	WS-C6509-NEB-FAN	WS-C6509-NEB-FAN2
6509-NEB-A	N/A	FAN-MOD-09(=)
6513	WS-C6K-13SLOT-FAN	WS-C6K-13SLOT-FAN2

Dimensions

Table 6 provides Catalyst 6500 Series chassis dimensions.

Table 6 Catalyst 6500 Series Chassis Dimensions

Dimension	Cisco Catalyst 6503	Cisco Catalyst 6506	Cisco Catalyst 6509	Cisco Catalyst 6509-NEB	Cisco Catalyst 6513
H x W x D (in.)	7 x 17.37 x 21.75 in.	20.1 x 17.2 x 18.1 in.	25.2 x 17.2 x 18.1 in.	33.3 x 17.2 x 18.1 in.	33.3 x 17.3 x 18.1 in.
H x W x D (cm)	17.8 x 44.1 x 55.2 cm	51.1 x 43.7 x 46.0 cm	64.0 x 43.7 x 46.0 cm	84.6 x 43.7 x 46.0 cm	84.6 x 43.7 x 46.0 cm

Table 6 Catalyst 6500 Series Chassis Dimensions

Dimension	Cisco Catalyst 6503	Cisco Catalyst 6506	Cisco Catalyst 6509	Cisco Catalyst 6509-NEB	Cisco Catalyst 6513
Rack units (RU); 1.75 in., 4.4 cm	4 RU	12 RU	15 RU	20 RU	20 RU

Weight

Table 7 provides the weight information for empty and fully configured Catalyst 6500 Series chassis.

Table 7 Catalyst 6500 Series Chassis Weights

Weight	Cisco Catalyst 6503	Cisco Catalyst 6506	Cisco Catalyst 6509	Cisco Catalyst 6509-NEB	Cisco Catalyst 6513
Chassis only (lb)	27	45	55	55	98
Fully configured (lb)	83	115	135	135	240
Chassis only (kg)	12	20	25	25	45
Fully configured (kg)	38	52	61	61	109

Ordering Information

Table 8 provides part number information for Catalyst 6500 Series chassis

Table 8 Catalyst 6500 Series Chassis Part Numbers

Part Number	Chassis
WS-C6503	Cisco Catalyst 6503 chassis (three slots)
WS-C6506	Cisco Catalyst 6506 chassis (six slots)
WS-C6509	Cisco Catalyst 6509 chassis (nine slots)
WS-C6509-NEB	Cisco Catalyst 6509-NEB chassis (nine vertically oriented slots)
WS-C6509-NEB-A	Cisco Catalyst 6509-NEB chassis (nine vertically oriented slots)–enhanced
WS-C6513	Cisco Catalyst 6513 chassis (13 slots)

Environmental Conditions

Table 9 provides environmental information for Catalyst 6500 Series Chassis.

Table 9 Catalyst 6500 Series Chassis Environmental Conditions

Parameter	Performance Range
Operating temperature	32 to 104 F (0 to 40 C)
Storage temperature	–4 to 149 F (–20 to 65 C)
Relative humidity	10 to 90%, noncondensing
Operating altitude	3000 meters
Mean time between failure (MTBF)	7 years for system configuration

Regulatory Compliance

Safety

- UL 1950
- EN 60950
- CSA-C22.2 no. 950
- IEC 60950
- AS/NZA 3260
- 21 CFR 1040
- EN 60825-1
- IEC 60825-1
- TS 001

EMC

- FCC (CFR 47, Part 15) Class A
- VCCI
- CE Marking
- EN 55022
- EN 55024
- CISPR 22
- AS/NZS 3548
- NEBS Level 3 (GR-1089-CORE, GR-63-CORE)
- ETSI ETS-300386-2

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Specifications

Table 10 provides an overview of Catalyst 6500 Series switches specifications, additional information can be found in software release notes.

Table 10 Catalyst 6500 Series Specifications

Specification	Number	Description
IEEE Compliance		
802.1	802.1d	Bridging
	802.1p, q	VLAN tagging
	802.1s	Per-VLAN Group Spanning Tree Protocol
	802.1w	Rapid Spanning Tree Protocol
	802.1x	
802.1	802.3	10BASE-T, 10BASE-FL
	802.3ad	Link aggregation
	802.3ab	1000BASE-T
	802.3ae	10 Gigabit Ethernet
	802.3u	100BASE-TX, 100BASE-FX
	802.3x	Flow control
	802.3z	1000BASE-SX, 1000BASE-LX
RFC Compliance		
ATM	1483, 2584	Protocol encapsulation over ATM AAL-5
		ATM permanent virtual circuit (PVC) to 802.1q tagging
BGP4	1269	Definitions of Managed Objects for the Border Gateway Protocol (Version 3)
	1745	Border Gateway Protocol/Open Shortest Path First (BGP/OSPF) interactions
	1771	BGPv4
	1965	BGP4 autonomous system confederations
	1966	BGP4 route reflection
	1997	Communities attribute
	2385	Transmission Control Protocol (TCP) MD5 authentication for BGP
	2439	Route flap dampening
	2796	Route reflection
	2842	Capabilities advertisement
General routing protocols	768	User Datagram Protocol (UDP)
	783	Trivial File Transfer Protocol (TFTP)
	791	IP

Table 10 Catalyst 6500 Series Specifications

Specification	Number	Description
	792	Internet Control Message Protocol (ICMP)
	793	TCP
	826	Address Resolution Protocol (ARP)
	854	Telnet
	894	IP over Ethernet
	903	Reverse Address Resolution Protocol (RARP)
	906	TFTP Bootstrap
	951, 1542	BootP, BootP extensions
	1027	Proxy ARP
	1122	Host requirements
	1256	ICMP Router Discovery Protocol (IRDP) IPv4 router discovery
	1519	Classless interdomain routing (CIDR)
	1541	Dynamic Host Control Protocol (DHCP)
	1591	Domain Name System (DNS) client
	1619	PPP over SONET
	1662	PPP HDLC-like framing
	1812	IPv4
	2131	BootP/DHCP
	2338	VRRP
		Internetwork Packet Exchange Routing Information Protocol/ Service Advertising Protocol (IPX RIP/SAP)
		Software-controlled redundant ports
IP multicast	1112	Internet Group Management Protocol (IGMP)
	1122 2236	Host extensions, Distance Vector Multicast Routing Protocol (DVMRP) IGMP v1, v2, v3 IGMP v1, v2, v3 Snooping
	2283	Multicast Border Gateway Protocol (MBGP)
	2362	Protocol-Independent Multicast (PIM)-SM
		DVMRP v3-07 Multicast Source Discovery Protocol (MSDP)
		PIM-Dense Mode (PIM-DM) v1

Table 10 Catalyst 6500 Series Specifications

Specification	Number	Description
		PIM-DM v2 Bidirectional PIM (Supervisor Engine 720 only)
Intermediate system to Intermediate system (IS-IS)	1195	TCP
	1377	PPP
	2763	Dynamic host name exchange
	2966	Domain-wide prefixes
LSP tunnels	2211	Controlled load network element service
	2702	Traffic engineering over MPLS
MPLS	2547	MPLS VPN
	2961	Resource Reservation Protocol (RSVP) refresh
	3031	MPLS architecture
	3032	MPLS label stack encoding
	3036	Label Distribution Protocol (LDP)
OSPF	1583	OSPF v2
	1587	OSPF NSSA
	1745	OSPF interactions
	1765	OSPF database overflow
	1850	OSPF v2 Management Information Base (MIB), traps
	1997	Communities and attributes
	2154	OSPF digital signatures, MD5
	2178	OSPF v2 (superceded by RFC 2328)
	2328	OSPF v2
	2370	OSPF opaque link-state advertisement (LSA) option
	2385	TCP M5
	2439	Route flap damping
	2842	Capabilities advertisement
	2918	Route refresh capability
RIP	1058	RIP v1
	1723	RIP v2
	2453	RIP v2

Table 10 Catalyst 6500 Series Specifications

Specification	Number	Description
Miscellaneous protocols	1866	HTML
	2030	Simple Network Time Protocol (SNTP) Version 4 for IPv4, IPv6 and OSI
	2068	HTTP
Denial of service (DoS) protection	2267	Network Ingress Filtering
		ACLs: wire-speed
		ICMP and IP-option control
		IP broadcast forwarding control
		Rate limiting using ACLs
		Unicast Reverse Path Forwarding (RPF)
		Server load balancing with Layer 3 and Layer 4 protection
		SYN attack protection
		Session control
Network management	782	VLAN Trunking Protocol (VTP)
	783	TFTP
	854	Telnet
	951	BOOTP
	1155	Structure of Management Information (SMIv1)
	1156	TCP/IP MIB
	1157	Simple Network Management Protocol (SNMP)v1
	1212	MIB definitions
	1213	SNMP MIB II
	1215	SNMP traps
	1256	ICMP router discovery
	1285	Station management (SMT) 7.3
	1354	IP forwarding table MIB
	1493	Bridge MIB
	1516	Ethernet repeater MIB
	1573	Interface table MIB
	1643	Ethernet MIB
	1650	Ether-like MIB

Table 10 Catalyst 6500 Series Specifications

Specification	Number	Description
	1657	BGPv4 MIB
	1724	RIPv2 MIB
	1757	RMON MIB
	1850	OSPFv2 MIB
	1901, 1907	SNMPv2c
	1908	SNMPv1/v2 coexistence
	2021	RMON2 probes
	2037	ENTITY-MIB
	2096	IP forwarding
	2233	Interface MIB
	2613	RMON analysis for switched networks (SMON) MIB
	2668	802.3 media attachment unit (MAU) MIB
	2787	VRRP MIB
	2925	Ping/Traceroute/NS Lookup MIB
		Sampled Netflow
		999 local messages
		BSD Syslog with multiple servers
		Configuration logging
		CISCO-CDP-MIB
		CISCO-COPS-CLIENT-MIB
		Cisco Discovery Protocol
		CISCO-ENTITY-FRU-CONTROL-MIB
		CISCO-PAGP-MIB
		CISCO-STACK-MIB
		CISCO-STP-Extensions-MIB
		Cisco Traffic Director Software
		CISCO-UDLDP-MIB
		CiscoView
		CISCO-VLAN-Bridge-MIB
		Cisco VLAN Director Software
		CISCO-VLAN-Membership-MIB

Table 10 Catalyst 6500 Series Specifications

Specification	Number	Description
		CISCO-VTP-MIB
		Cisco Workgroup MIB
		SPAN and Remote SPAN (RSPAN)
		Hot Standby Routing Protocol (HSRP)
		HC-RMON
		HTML/HTTP management
		NetFlow v1 export
		RMON HP Open View
		SMON-MIB
		Standard Cisco IOS Software security capabilities: passwords and TACACS+
		Telnet client
		Telnet management
		Text-based CLI
		Web-based GUI Management Tools (CiscoWorks)
Security	1492	Terminal Access Controller Access Control System Plus (TACACS+)
	2138	Remote Authentication Dial-In User Service (RADIUS) authentication
		ACLs for Layers 2, 3, 4, and 7
		Access profiles on all routing protocols
		Access profiles on all management methods
		Media Access Control (MAC) address security/lockdown
		Network Address Translation (NAT)
		Network login (including DHCP/RADIUS integration)
		RADIUS accounting
		RADIUS per-command authentication
		Secure Copy Protocol (secure file transfer)

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- Complements remote technical support with onsite hardware replacement

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For more information, visit:

http://www.cisco.com/en/US/products/svcs/ps3034/serv_category_home.html

Additional Cisco Catalyst 6500 Series Information

For additional information about the following data sheets that describe Cisco Catalyst 6500 Series, supervisor engines, interface modules, SFM, and services modules, visit:

http://www.cisco.com/en/US/products/hw/switches/ps708/products_data_sheets_list.html

- Cisco Catalyst 6500 Series Supervisor Engine 1A and Supervisor Engine 2 Data Sheet
- Cisco Catalyst 6500 Series Supervisor Engine 720 Data Sheet
- Cisco Catalyst 6500 Series 10/100 and 10/100/1000 Ethernet Interface Modules Data Sheet
- Cisco Catalyst 6500 Series Gigabit Ethernet Interface Modules Data Sheet
- Cisco Catalyst 6500 Series 10 Gigabit Ethernet Interface Modules Data Sheet
- Cisco Catalyst 6500 Series FlexWAN Interface Modules Data Sheet
- Cisco Catalyst 6500 Series Switch Fabric Interface Modules Data Sheet
- Cisco Catalyst 6500 Series Content Services Module Data Sheet
- Cisco Catalyst 6500 Series Firewall Services Module Data Sheet
- Cisco Catalyst 6500 Series Network Application Module (NAM) Data Sheet
- Cisco Catalyst 6500 Series Intrusion Detection (IDS) Module Data Sheet
- Cisco Catalyst 6500 Series IPSec VPN Services Module Data Sheet
- Cisco Catalyst 6500 Series SSL Services Module Data Sheet

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